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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/089,076 | 04/09/2002 | Yasutaka Ogawa | 020473 | 5822 |

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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

LUGO, DAVID B

ART UNIT PAPER NUMBER

2611

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/089,076 | OGAWA ET AL. | |
| | Examiner | Art Unit | |
| | David B. Lugo | 2611 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-12, 15-18 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-3, 13, 19 and 21-23 is/are rejected.
- 7) ☒ Claim(s) 4, 14, 20 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2002 and 17 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawing replacement sheets of Figures 4 and 18 were received on 1/17/06. These drawings are acceptable.

Response to Arguments

2. The objections to the drawings have been withdrawn as Applicant has amended the drawings as required in the previous Office action.

3. The objections of claims 5-14 and 16-23 have been withdrawn as Applicant has amended the claims as required in the previous Office action.

4. Applicant's arguments filed 1/17/06 with respect to the rejection of claims 1-3, 13, 19 and 21-23 have been fully considered but they are not persuasive.

Regarding claim 1, Applicant argues that Suzuki does not disclose extracting means for extracting signal components corresponding to the plurality of users, as recited in claim 1. The Examiner respectfully disagrees, as the integrator 23 of Suzuki (Figure 5) operates in conjunction with multiplier 22 which multiplies a received signal by a spreading code C_a to provide a correlation value (col. 2, lines 46-52), where the spreading code used in multiplier 22 corresponds to the code used to spread a user signal to be transmitted (col. 1, lines 20-22). Accordingly the output of integrator 23 includes signal components extracted from a received signal according to the despreading process performed by the multiplier 22 in conjunction with integrator 23 that specifies the respective user signals (col. 1, lines 26-31).

Applicant further argues that Suzuki does not disclose the estimator 24 of Suzuki fails to estimate parameter information related to a relation between extracted signal components and the

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output signal from the signal processing means, since integrator 23 fails to extract signal components and the estimator 24 does not receive an output signal from the signal processing means. The Examiner respectfully disagrees. The integrator, in conjunction with multiplier 22 is considered to extract signal components as discussed above. Further, the claim does not require that the estimator receive an output signal from the signal processing means. Rather, the claim requires that the estimating means estimate “parameter information related to relation between the signal components extracted by the first signal extracting means and the signal output from the signal processing means.” Suzuki discloses that estimator 24 determines parameter information, namely, a transmission path fading vector (col. 2, lines 50-52). In the combination of Suzuki with Keskitalo et al., this parameter is broadly considered to be related to relation between signal components extracted by the first signal extracting means and the signal processing means of Keskitalo et al., coupled to the despreader 73 of Suzuki in the proposed combination, as the “relation” is that the fading vector is included in both signals.

Applicant also argues that the quality comparison controller 32 of Suzuki does not disclose whether the extracted signal components include a demodulation error or not. However, as indicated by the section quoted in Applicant’s response, a control signal is output if the reception quality is made poorer by the interference cancellation (control signal output if E_b/N_0 measured by measuring unit 34 is more degraded than E_b/N_0 of the received signal – col. 9, lines 11-14). Thus, the control signal is considered to be an indication of whether there was a demodulation error or not, and Suzuki is considered to disclose the claimed error determining means.

Finally, Applicant argues that the subtractor 54 and adder 57 fails to constitute operating means for subtracting, from the signal output from the signal processing means, the extracted signal component determined by the error determining means not to include any demodulation error, in consideration of corresponding parameter information. However, as stated in column 12, lines 16-22, interference cancellation is only turned off if the reception quality becomes more degraded after interference cancellation by a respective ICU. Thus, if the control signal indicates that the reception quality is not degraded, then the interference cancellation performed by the ICU will not be turned off (via block 30 – see Fig. 5), and the subtractor 54 will subtract the extracted signal component output from the ICU not turned off (i.e. the one determined not to include any demodulation error). Accordingly, Suzuki is considered to disclose the claimed first operating means. The rejection of claim 1 is maintained.

Regarding claim 13, Applicant refers to the arguments presented with respect to claim 1. Since the rejection of claim 1 is maintained, the rejection of claim 13 is also maintained.

Claim Objections

5. Claim 24 is objected to because of the following informalities:

Claim 24, line 2, “correlation value” should be --the correlation value--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 13 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki U.S. Patent 6,584,115 in view of Keskitalo et al. U.S. Patent 6,091,788.

Regarding claim 1, Suzuki discloses a reception system in Figure 7 including multiuser interference cancellers 41a-41c, an example of one interference canceller shown in Fig. 5, where the interference cancellers 41a-41c are comprised of a plurality of signal extracting means 23 for extracting signal components corresponding to the plurality of users, a plurality of estimating means 24 for estimating parameter information, a plurality of error determining means (quality comparison controller 32) for determining whether the signal components include a demodulation error and providing such indication to the interference unit of a preceding block, and the reception system further comprises operating means which include subtractor 54 and adder 57 (ref. numbers listed in Fig. 3) for subtracting the extracted signal component determined by the error determining means 24, as a control signal is provided to an on/off controller 30 of the interference canceller such that if demodulation errors are present, the signal is not included for combination in the operating means (col. 12, lines 4-15). In the embodiment of Figure 7, the function of the estimating means is performed by central controller 66. However, one of ordinary skill in the art would recognize that either the central controller or the plurality of estimating means may be used as a matter of design consideration, as both provide control signals to respective interference cancellers in order to control respective on/off controllers 30.

Suzuki does not disclose that the system includes a plurality of antennas, and signal processing means for performing signal processing on the signals received by the antennas.

Keskitalo et al. disclose a reception system including an antenna array and signal processing means, as shown in Figure 4.

It would have been obvious to one of ordinary skill in the art to use an antenna array as disclosed by Keskitalo et al. in the system of Suzuki in order to improve the spectral efficiency of the system, as stated by Keskitalo et al. in column 3, lines 33-36.

Regarding claim 2, Suzuki further discloses a second stage of interference cancellers 42a-42c, an example of one interference canceller shown in Fig. 5, where the interference cancellers 41a-41c are comprised of a plurality of signal extracting means 23 for extracting signal components corresponding to the plurality of users, a plurality of estimating means 24 for estimating parameter information, and a plurality of first error determining means (quality comparison controller 32) for determining whether the signal components include a demodulation error and providing such indication to the interference unit of a preceding block. In the embodiment of Figure 7, the function of the estimating means is performed by central controller 66. However, one of ordinary skill in the art would recognize that either the central controller or the plurality of second estimating means may be used as a matter of design consideration, as both provide control signals to respective interference cancellers in order to control respective on/off controllers 30.

Regarding claim 3, Suzuki further discloses that the reception system further comprises second operating means which include subtractor 55 and adder 59 (ref. numbers listed in Fig. 3) for subtracting the extracted signal component determined by the error determining means 24, as a control signal is provided to an on/off controller 30 of the interference canceller such that if

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demodulation errors are present, the signal is not included for combination in the operating means (col. 12, lines 4-15).

Regarding claim 13, Suzuki discloses a reception system in Figure 4 comprising a stage of interference cancellers including a plurality of interference removing units that comprise an ICU and a subtractor (e.g. 11a and 4), an example of an ICU shown in Fig. 5 to include signal extracting means 23 for extracting signal components corresponding to the plurality of users, a plurality of estimating means 24 for estimating parameter information, and error determining means (quality comparison controller 32) for determining whether the signal components include a demodulation error and providing such indication to the interference unit of a preceding block for disabling removal of the signal component by the operating means. The operating unit of the interference removing units includes operating means 4 (Fig. 4) for removing the signal component corresponding to the specific user from the signal input to the signal extracting means. Suzuki further shows that the output of an operating unit of an interference removing unit (operating means 4) is applied to inputs of the signal extracting means and operating means of a latter stage interference removing unit.

Suzuki does not disclose that the system includes a plurality of antennas, and signal processing means for performing signal processing on the signals received by the antennas.

Keskitalo et al. disclose a reception system including an antenna array and signal processing means, as shown in Figure 4.

It would have been obvious to one of ordinary skill in the art to use an antenna array as disclosed by Keskitalo et al. in the system of Suzuki in order to improve the spectral efficiency of the system, as stated by Keskitalo et al. in column 3, lines 33-36.

Regarding claim 21, Suzuki in combination with Keskitalo et al. disclose a radio reception system as disclosed in accordance with claims 1 and 13 above, but do not expressly disclose that the signals are transmitted in accordance with a PDMA communication method. However, PDMA is a well known communication method, and implementation of PDMA in the system of Suzuki is deemed a design consideration that fails to patentably distinguish.

Regarding claim 22, Suzuki discloses that the signals are transmitted in accordance with a CDMA protocol.

Regarding claim 23, Suzuki discloses that the transmitted signals are spread by spreading codes on a transmitting side (col. 1, lines 19-22), and further discloses that the system comprises inverse spreading means 22 for inverse spreading the signals and applying the results to the signal extracting means 23 (see Fig. 5, col. 2, lines 46-50).

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Keskitalo et al. as applied to claims 1 and 13 above, and further in view of Ishii et al. U.S. Patent 6,222,498.

Regarding claim 19, Suzuki in combination with Keskitalo et al. disclose a radio reception system as disclosed in accordance with claims 1 and 13 above, but do not expressly disclose that the signal extracting means is an adaptive array spatially separating and extracting signal components corresponding to specific users.

Ishii et al. disclose a reception system in Figure 5 including interference cancellation units 64a-64c, shown in Figure 6 to include signal extracting means (82a, 82b, 84) for spatially separating and extracting signal components corresponding to specific users according to antenna weights (col. 7, lines 29-33).

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It would have been obvious to one of ordinary skill in the art to use the signal extracting means of Ishii et al. in the system of Suzuki in combination with Keskitalo et al. in order to maintain improved interference cancellation (see Ishii et al. col. 5, lines 38-47).

Allowable Subject Matter

9. Claims 5-12, 15-18 and 25 are allowed.
10. Claims 4, 14 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
11. Claims 19-23 would be allowable if rewritten to depend from claims 5 or 15.
12. Claim 24 would be allowable if rewritten to overcome the objection set forth above.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

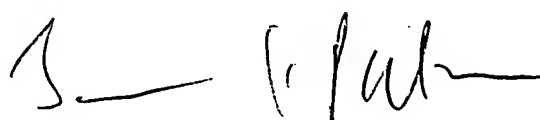
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to David B. Lugo whose telephone number is 571-272-3043. The examiner can normally be reached on M-F; 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Lugo
3/31/06

A handwritten signature in black ink, appearing to read 'J. K. Patel', is written over a horizontal line.

JAY K. PATEL
SUPERVISORY PATENT EXAMINER